

A jig for punching small holes in sheet-metal

Drew Diamond VK3XU

When making holes in thin sheet metals using ordinary jobber drills, it is usual for us to get a burred hole. And sometimes, despite our best efforts, the drill wanders out of the centre-punch mark resulting in a hole in the wrong spot.

If you often need to make clean round holes in sheet brass, aluminium and printed circuit board, consider fabricating a simple gadget along the lines offered here.

The jig consists of two parallel bars of ordinary mild steel (MS), held rigid by two high-tensile M8 bolts. A small spacer bar of 3 mm MS bar at the heel end provides a workable separation between.

Tool merchants and auto supply shops (eg Super Cheap Auto) usually sell "pin" or "scroll" punch sets. That shown in Photo 1 consists of a punch for 3, 4, 5, 6 and 8 mm, which should suit many applications in radio/electronics and model work.

Fabrication

Prepare two identical lengths of 40 mm x 8 mm MS bar of a length to suit the proposed application (300 mm is suggested). It is vital that the top and bottom halves of the jig should register perfectly. In the top half only, carefully mark and centre punch where the two 8 mm bolt holes shall be. Firmly clamp the top and bottom pieces exactly together upon your drill table. Now drill through both bars, first with a pilot of (say) 5 mm, then follow through with 8 mm. De-burr as necessary.

Place the two bars together, then install and tension the two bolts. Arbitrarily mark

out upon the top bar exactly where each punch hole shall be located. Remember that a mounting lug must later be welded upon the underside, so allow room for the lug and a fillet of weld.

Drill an exactly similar diameter hole right through the top and bottom bar for each punch, as required. Suitably mark or stamp (suggest at the heel end) the top and bottom plates to assign congruency upon the final assembly.

Fabricate a spacer from 25 x 3 mm MS bar, 40 mm long, as shown on Fig 1. Using the top bar as a template, mark, and then drill two exactly corresponding bolt holes.

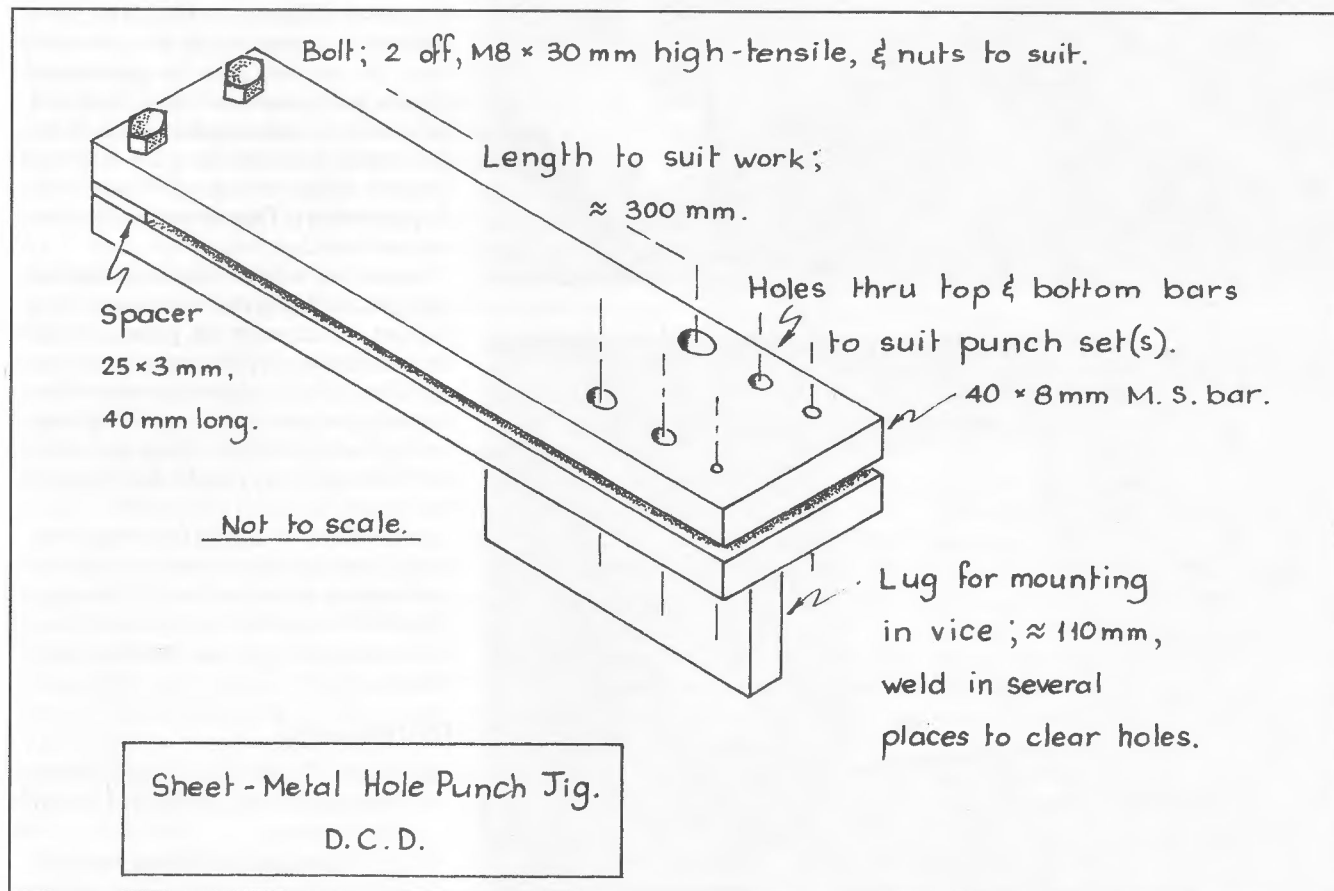


Figure 1

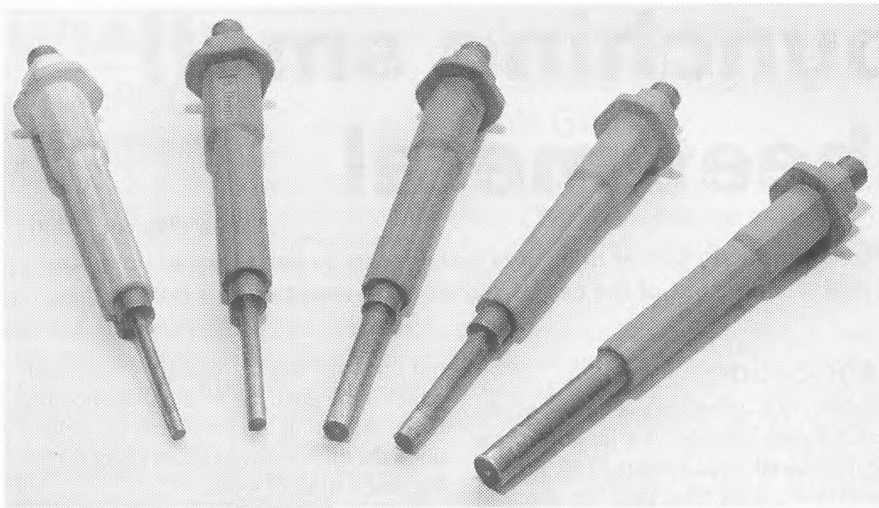


Photo 1

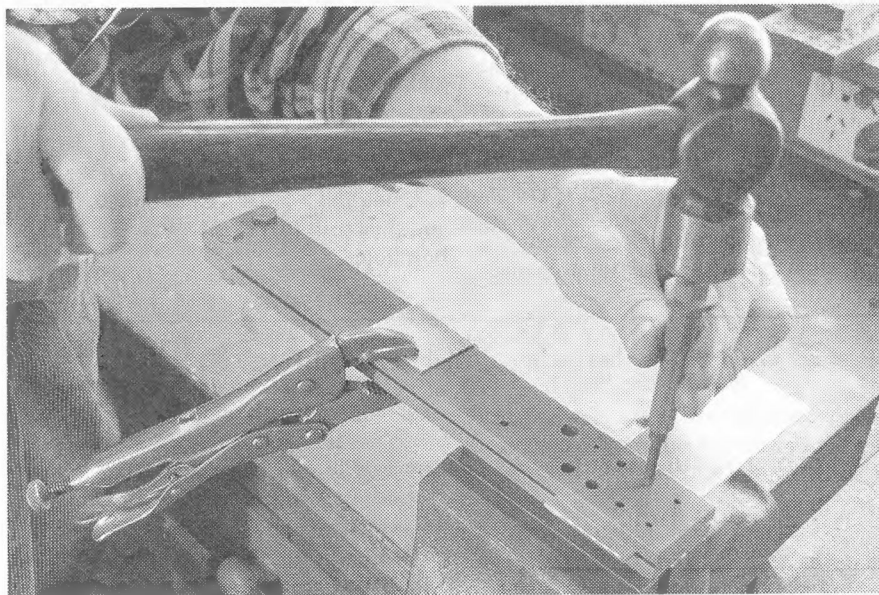


Photo 2

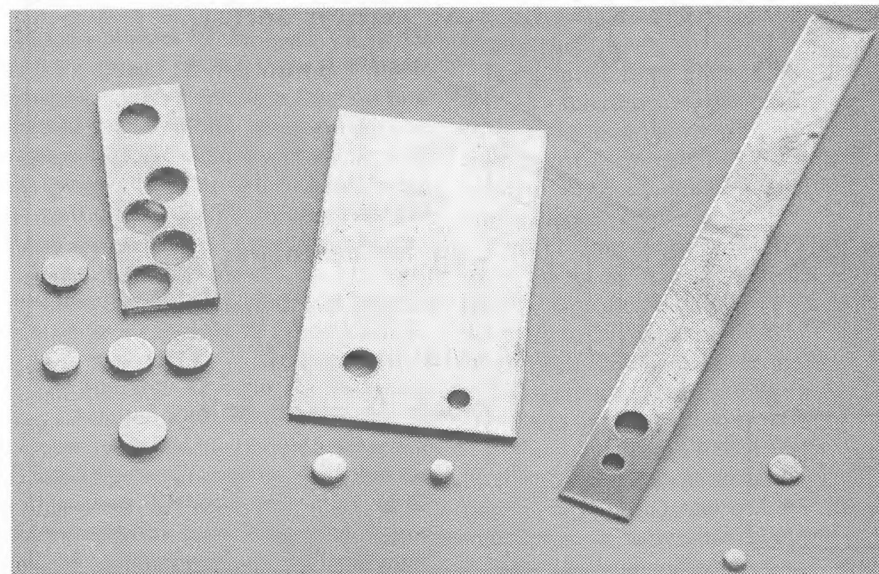


Photo 3

Assemble the jig initially by installing the two bolts and nuts to finger tightness. Insert all the punches in their respective holes and, with these in place (to maintain congruency), finally tension the bolts. The punches should remove easily.

The punch works better if the bottom hole is just a "bee's whisker" larger than the nominal hole size. For example, for the 3 mm enlarge the bottom hole by following through with the next larger drill size, a #31 drill. For 4 mm use a drill size #21; for 5 mm use a #8; for 6 mm use a letter B; and for 8 mm use a letter O. For this operation, the bars should be spaced with a scrap of 25 mm x 3 mm bar inserted near the toe of the jig, drilling the bottom bar only, of course. Take care (use the drill-press depth-stop) that the drill does not enter the top bar. All holes should be de-burred by draw-filing.

A 110 mm length of 40 mm x 8 mm bar must be welded to the bottom bar to act as a vice fixing lug. Avoid welding close to the holes - simply dodge where necessary.

Operation

The jig is mounted in your vice, as illustrated in Photo 2. The exact hole position is sighted by looking straight down the top hole onto the job. A pair of vice-grip pliers will then be found very handy in bringing the halves of the jig together such that the work is firmly clamped in the exact position required. Any distortion (of the sheet-metal) is thus also prevented.

One or two hammer blows are applied with just sufficient force to punch out a slug, at which point the punch should be withdrawn (if the punch is driven right through, considerably more effort is needed to pull it back up through the work). The sheet metal is then removed, and the slug(s) may then be driven out of the bottom hole with little effort.

Examples of holes (and their slugs) thus made in printed circuit board, aluminium and brass are shown in Photo 3. The slugs obtained from printed circuit board may be saved, and used as "paddyboard" islands.

Reference

Electrical Things Boys Like to Make;
Sherman Cook, pp 162-3, Lindsay
Publications.

Photographs: Andrew Diamond.

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